Michigan Department of Community Health
Bureau of Laboratories
Division of Chemistry and Toxicology, Trace Metals Section

Soil Sampling Procedure for Lead

Contents

1. Soil Sampling Tools and Materials:

a. Core sampling device with a minimum diameter of 1 inch, capable of being forced at least 2 inches into the ground. Other core sampling devices may be used, such a disposable plastic syringes with the end cut off. The plunger is used to remove the soil from the syringe body.
b. Disposable wipes
c. Collection containers. The preferred containers are rigid sealable containers, such as 50 mL screw-top plastic centrifuge tubes. Centrifuge tubes can also be used as scooping devices. Do not use breakable materials. 1-quart or 1-gallon plastic ziptop bags may also be used. Plastic bags must be double-bagged, unless they are 4 mil industrial strength.
d. Spoon, lead free, to use as a scooping device
e. Non-sterilized non-powdered disposable gloves.
f. Property sketch
g. Environmental Lead Sampling Request DCH-0558 December 2011.
h. Pre-printed labels or permanent ink pen
i. Trash bags
j. Cleaning cloths and water, for cleaning sampling tools

3. Bare Soil Sampling Procedures and Techniques.

a. Soil sampling is not recommended when the ground is frozen. If there is snow cover preventing soil sampling, you must return to the site to collect soil samples in the spring.

b. The location of soil samples should be recorded on the site plan sketch included in the risk assessment report.

c. Put on a new pair of clean disposable gloves for each soil sample.

d. Sampling Locations:

The collection of multiple subsamples in a single collection container is referred to as a "composite" sample.

Perimeter: Separate composite samples should be collected for each side of the building perimeter. At least 5 and no more than 10 different subsamples of surface soil are collected from each side. Each subsample should be at least 2 feet distant from each other (farther if the building side is long) and 2 feet away from the foundation and within the dripline when possible, unless the bare soil is closer than 2 feet from the foundation.

Play Areas: Composite samples for play areas should consist of at least 5 and no more than 10 subsamples collected along an X-shaped grid in the child's principle play area. Each spot should be at least 1 foot apart from each other. The soil where the subsamples are collected must be bare.

e. No special effort should be made to collect visible paint chips. If paint chips are present, they should not be avoided and should be included in the sample. When sampling play areas, the inspector should make an effort to avoid including grass, twigs, stones, and other large debris (other than paint chips) in the sample. Samples should be taken from bare soil areas only; grass or sod does not need to be removed.

f. Collection Techniques: The two acceptable techniques are scoop sampling and core sampling.

   i. Scoop sampling is appropriate for semisoft, sticky, and loose sandy soils.
      a. Using a rigid-walled container (e.g. centrifuge tube): Determine the depth to which you should insert the container in order to collect the top 1 inch of soil. Push the container into the soil and scrape the container 4-8 inches horizontally along the soil surface.
      b. Using a spoon: Use the spoon and a measuring tape to dig a test hole about 1 in. deep. Clean the spoon using a water and cloth. Then, using the test hole as a guide for depth, scoop the spoon down approximately 1 inch deep. Collect soil until the hole is about 2 inches diameter and 1 inch deep. These dimensions allow for the size of the spoon in collecting the soil.

   ii. Core sampling is appropriate for dense, hard, or sticky soils. Coring devices can be used in one of two ways:
      a. Most coring devices come with a "T" handle which can be attached to the top of the coring tool or probe. This allows the tool to be pushed into the ground. The top of the coring tool can be twisted with the "T" handle as it is pushed into the ground in order to allow the cutting edge of the soil probe to cut through roots and packed earth. In softer soils, a disposable new plastic syringe can be used for each composite sample.
      b. The other method for using the coring tool is to attach a hammer device to the top of the coring tool. To utilize the coring tool in this manner, the hammer device is first attached to the top of the coring tool and the tip of the probe is placed on the

ground where the sample is to be collected. The hammer is then raised and allowed to fall while it is guided by the operator's hands. The hammer attachment may be the most appropriate tool when the nature of the soils is hard and compacted. Otherwise the "T" handle is easier to use.

The samples are collected by driving or pushing the coring tool into the ground at least 1/2 inch deep. A deeper push makes the soil easier to collect. The tool is moved gently from side to side to loosen a plug of soil. The tool is then pulled from the ground and the soil sample is pushed so that the upper part of the soil plug lies between one inch marks made on the coring device. The top 1/2 inch of the soil sample is then cut from the core with a stainless steel knife or cutting tool provided for that purpose. This top one-half inch section of the soil core is then transferred to a sample container. Each subsamples is collected in this manner.

After collecting a composite sample, the soil probe or core sampler should be decontaminated by wiping with a clean disposable wet cloth until no more visible dirt is removed from the tool. If a disposable core sampler is used, it can be used for all sub-samples, but not new composite samples unless it is cleaned as described above.

g. When all subsamples of the composite sample have been placed in the sampling container, the container should be sealed. If using a plastic bag and the bag is not 4 mil industrial weight, the sample should be double-bagged.

3. Trash Disposal:

After sampling, remove gloves; put all contaminated gloves and sampling debris used for the sampling period into a trash bag. Take the trash bag with you when leaving the dwelling. Do not throw away gloves or wipes inside the dwelling unit.

4. Inspector Decontamination:

Personnel conducting paint sampling should avoid hand-to-mouth contact (specifically: smoking, eating, drinking, and applying cosmetics) and should wash their hands with running water immediately after sampling. The inspector should ask to use the resident's bathroom for this purpose. Wet wipes may be used if running water or the bathroom is not available.

5. Form Completion and Fees:

a. Label containers with at least two (and ideally three or more) identifiers, using either a pre-printed label or permanent marker. The identifiers should include a sample number and a site identifier (such as street address), as well as the location where the sample was taken (such as bare soil or play area number). Identifiers should match the sample numbers on the Environmental Lead Sampling Requisition form.

b. Fill out the Environmental Lead Sampling Request for Soil completely.

c. Chain of custody requirements should be followed if applicable.

d. Fees: Contact the MDCH lab for information about fees. Fee-based samples will only be accepted from counties with certified lead inspectors. A check payable to the State of Michigan and a list of clients must be submitted with each specimen. Attach the check to the Environmental Lead Sampling Request. A billing procedure for testing services may also be arranged with the laboratory. Local public health departments are exempt from a fee when submitting public health-related samples, which are environmental lead specimens for lead-poisoned client. Individuals wishing to submit samples should contact their local health department to arrange billing, submittal, and payment.

6. Quality Assurance/Quality Control:

Any questions or problems concerning environmental sampling results should be directed to:

MDCH - Trace Metals Laboratory
3350 N. Martin Luther King Blvd.
Lansing, MI 48909
Phone: (517) 335-8244
Fax: (517) 335-9776
Email: knottnerusm@michigan.gov or larivierec@michigan.gov

Questions on sampling procedures can be directed to the MDCH Healthy Homes Section at 1-866-691-LEAD.

7. Lead Hazard Identification:

In accordance with Michigan administrative rule R325.99402 and the U.S. Environmental Protection Agency 40 CFR Part 745.227, the following lead levels became effective for lead hazard control activities in the state of Michigan on March 6, 2001:

Hazard Determination and Clearance Levels - at or above:

400 μg/g, bare soil, play areas
1200 μg/g, bare soil, other parts of the yard

8. References:

a. ASTM E 1727-05. Standard practice for Field Collection of Settled Soil Samples for Subsequent Lead Determination. Copies are available on the ASTM website (for a fee) at: http://www.astm.org/Standards/E1727.htm.

b. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, U.S. Department of Housing and Urban Development, June, 1995. Copies of the Guidelines are available on the HUD website at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines.